

# Mono Lake Tufa

## State Natural Reserve

# Mono Basin National Forest Scenic Area



## Our Mission

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## Mono Lake Tufa State Natural Reserve

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Lee Vining, CA 93541

(760) 647-6331

e-mail: [monolake@parks.ca.gov](mailto:monolake@parks.ca.gov)

Front Cover Photo by Jim Stimson

*"A country of wonderful contrasts,  
hot deserts bordered by snow-  
laden mountains, cinders and  
ashes scattered on glacier-polished  
pavement, frost and fire working  
together in the making of beauty."*

John Muir



## Wildlife

Mono Lake has been called a dead sea, but it actually abounds with life. Few animals can tolerate Mono's salty, alkaline water, but these few species thrive in astronomical numbers.

The food chain begins with green algae, a microscopic one-celled plant. Algae uses decayed organic matter and sunlight to grow. In the winter, when the algae blooms, the lake may become pea soup green.

Two animals feast on the algae—the brine shrimp and the alkali fly.

Alkali fly females can actually walk into the lake in an air bubble and lay their eggs on pieces of rock or tufa. An egg becomes a larva and then a pupa before the adult fly finally emerges. The pupa stage of the alkali fly was collected by the local Kuzedika Paiute Indians and used as a food source and trade item.

The half-inch long brine shrimp can be seen in Mono Lake from April through October. At the height of the summer season, an estimated four trillion shrimp swim in Mono's waters. As winter approaches the adult brine shrimp begin to die off, but not before they lay eggs that will overwinter in the lake-bottom mud. The eggs hatch out as the lake water warms in the spring. Mono's shrimp (*Artemia monica*) are thought to be a unique species that has adapted to Mono's special conditions.

Mono's shrimp and flies provide a plentiful food supply for more than eighty species of migratory birds that visit the lake each spring and summer. Particularly notable bird species include three

migrants: Wilson's and red-necked phalaropes and eared grebes, and two nesting species: California gulls and Snowy plovers.

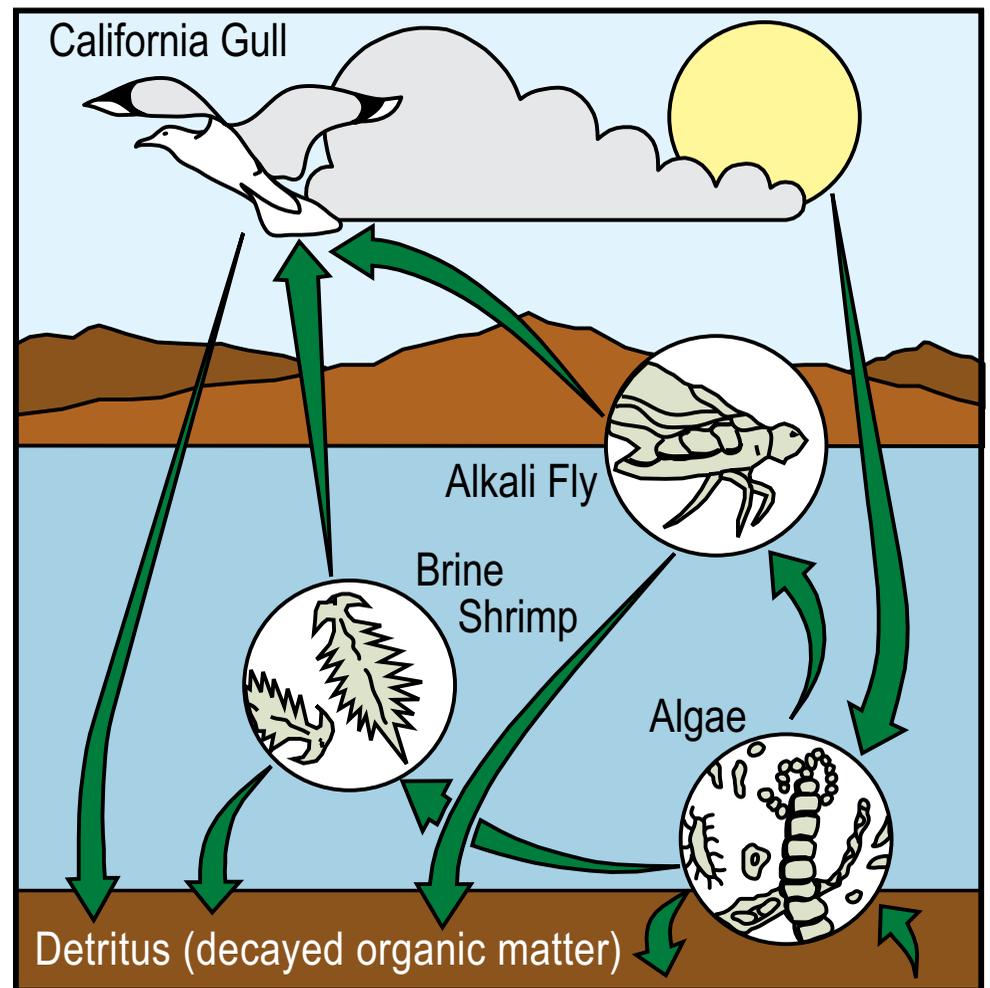
The small, graceful phalaropes are delightful to watch as they pick alkali flies off the surface of the lake or snatch them from the air. From 80,000 to 100,000 phalaropes visit Mono Lake in July and August. They winter in warmer South American climates.

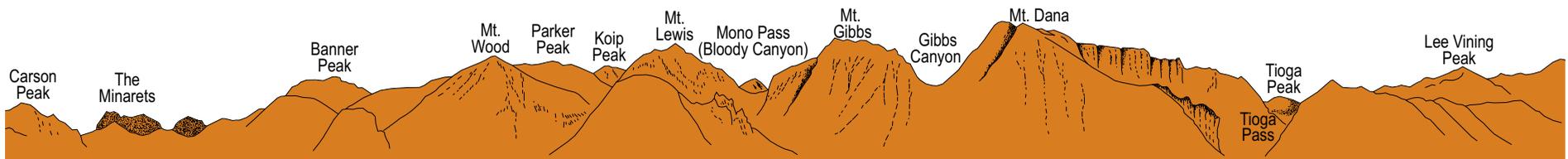
Eared grebes visit Mono Lake in astonishing numbers. An estimated 1.5 million of them make a spectacular sight during the fall migration from August through October. Grebes can be seen diving for food in the lake, but are never seen on land as their legs are designed for swimming rather than walking.

About 50,000 adult California gulls fly to Mono Lake from the coast each spring to nest, where food and island

nesting sites are plentiful. Approximately 90% of the California population of this species are born at Mono Lake.

Endangered snowy plovers nest along the windswept alkali flats of Mono Lake's eastern shore. Approximately 100 Snowy plovers nest along the windswept alkali flats of Mono Lake's eastern shore.





## Geology

Mono Lake's modern landscape has been shaped over millions of years by faulting and volcanic activity.

For the last three to four million years, the whole basin has been tilting westward and sinking while the Sierra has been rising. This ongoing process has created the majestic contrast of a desert lake bordered by high mountain peaks. As the western floor of the Mono Basin slipped downwards, its southern and northern margins tilted slowly towards its center, forming a bathtub-like basin that filled with water to form Mono Lake.

About 12,000 years ago, following the peak of the last great ice advance, the Mono Basin filled and even overflowed for a short time. This Ice Age lake covered 338 square miles and reached a depth of about 900 feet, five times larger than the modern lake.

You can see evidence of Mono's Ice Age glaciers in the morainal embankments at the mouths of Bloody Canyon and Lee Vining Canyon.

The Mono Basin's long history of volcanism is evident in the hills that mark the north and east boundaries of the basin—hills that date back some 11 million years. To the south lie the Mono Craters, the youngest mountain range in North America. Panum Crater, the northernmost of these craters, erupted only 650 years ago. Panum is easily reached from Highway 120, three miles east of Highway 395.

Mono's islands are also volcanic. Paoha Island is thought to be about 300 years old. Hot springs and steam vents in the basin show that volcanic activity is still present.

Black Point on the north shore of Mono Lake is the result of a volcanic eruption that began beneath the lake about 13,000 years ago. At that time the lake level was still rising toward its post Ice Age high point, but the lake was already some 400 feet deeper than it is today. As the top of Black Point cooled and contracted, narrow cracks or fissures formed on the summit—some of them only a few feet wide but as much as fifty feet deep. Some of those fissures can be explored today. Look for tufa that formed in the cracks when the top of Black Point was still under Mono Lake.

## Tufa

Salty lake water (carbonates) + freshwater springs (calcium) = Tufa (calcium carbonate).

Mono Lake's tufa towers (pronounced "toofah") are spectacular examples of what nature can do with a few basic elements. These unusual spires and knobs are formed when calcium-bearing freshwater springs happen to well up through alkaline lake water, which is rich in carbonates. The calcium and carbonate combine, precipitating out as limestone. Over many years, a tower forms around the mouth of the spring. This tufa-forming reaction happens only in the lake itself. As the lake level drops and exposes the tufa towers, they cease to grow.

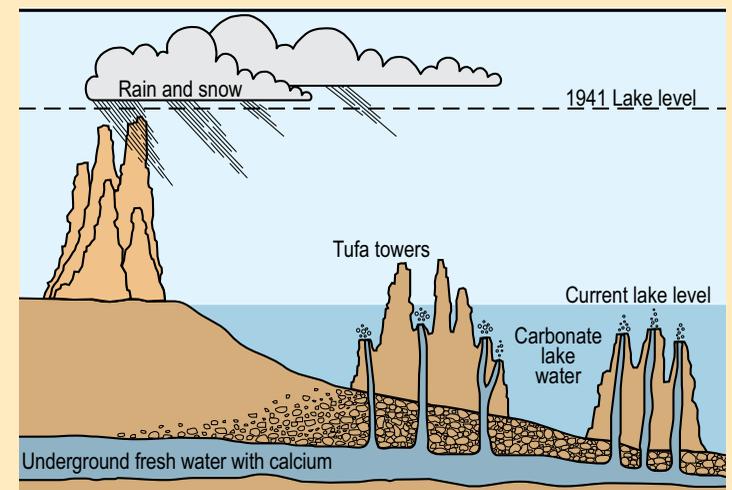
The towers at South Tufa are estimated to be between 200 and 900 years old. Far older tufa towers, some of them as much as 13,000 years

old, can still be found high above the current lake, along Mono's ancient shore.

Tufa is found in other alkaline bodies of water, but the variety and quantity of Mono's towers are unique.

Tufa is also formed as freshwater springs percolate through briny lake-bottom sand. The "sand tufas" are intricate sand tubes and columns exposed as winds strip away their sandy coverings. You can see sand tufa formations near the Navy Beach parking lot.

The best place to visit the tufa towers is at the spectacular South Tufa Area (see map).





South Tufa Area formations



State Natural Reserve boardwalk



Mono Basin Visitor Center



**Mono Lake Tufa State Natural Reserve**  
 P. O. Box 99  
 Lee Vining, CA 93541  
 (760) 647-6331

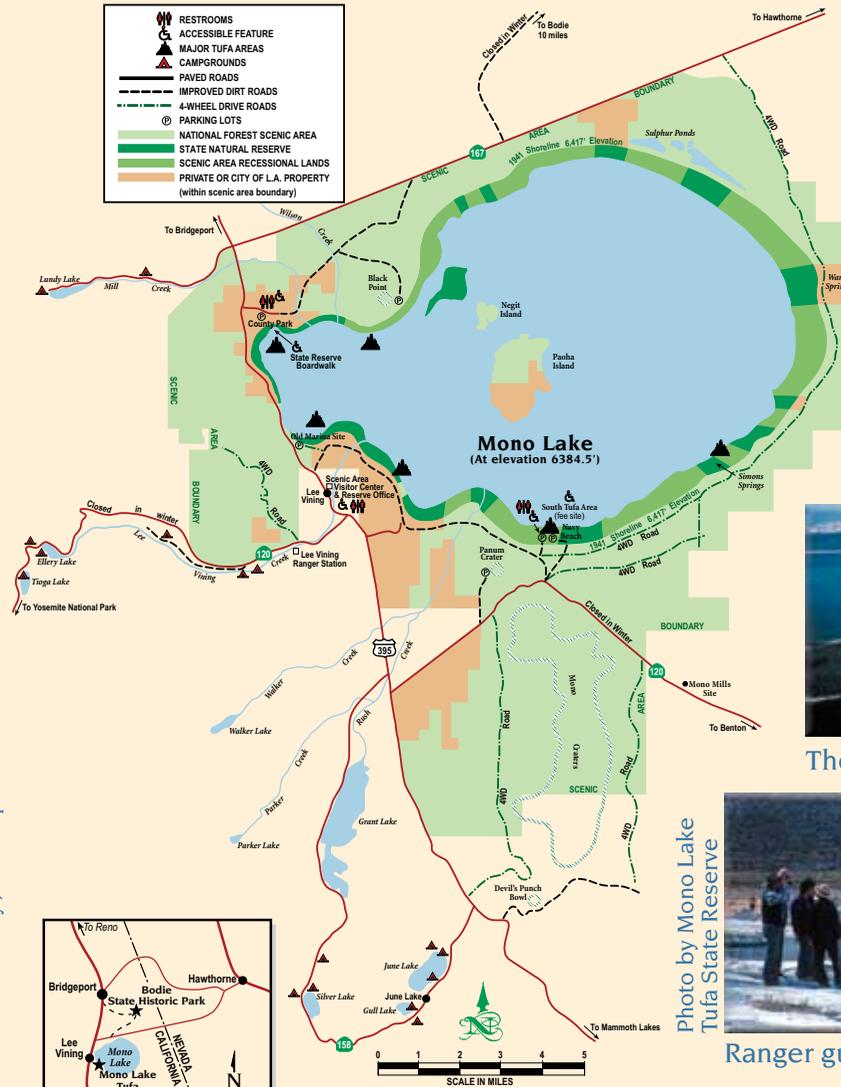
Mono Lake Tufa State Natural Reserve consists of those state-owned lakebed lands below the elevation of 6,417 feet above sea level. The Reserve was established in 1982 to preserve the spectacular tufa formations and other natural features of Mono Lake. California State Parks and the U.S. Forest Service work cooperatively to manage the public lands around Mono Lake.

Photo by Mono Lake Committee

Photo by Jim Stroup



	RESTROOMS
	ACCESSIBLE FEATURE
	MAJOR TUFA AREAS
	CAMPGROUNDS
	PAVED ROADS
	IMPROVED DIRT ROADS
	4-WHEEL DRIVE ROADS
	PARKING LOTS
	NATIONAL FOREST SCENIC AREA
	STATE NATURAL RESERVE
	SCENIC AREA RECREATIONAL LANDS
	PRIVATE OR CITY OF L.A. PROPERTY (within scenic area boundary)



**Mono Basin National Forest Scenic Area**  
 P. O. Box 429  
 Lee Vining, CA 93541  
 Mono Basin Visitor Center (760) 873-2408 ext. 5

The Mono Basin National Forest Scenic Area was designated by Congress in 1984 to protect the natural, cultural and scenic resources of the Mono Basin. The Scenic Area encompasses 116,000 acres and includes the Mono Basin Visitor Center in Lee Vining. The Mono Basin Scenic Area was the first of its kind in the National Forest System. California State Parks and the U.S. Forest Service work cooperatively to manage public lands around Mono Lake.

**Please Remember**

- Tufa may not be damaged or collected anywhere in the Mono Basin.
- Vehicles must stay on designated roads and parking areas. Contact the Scenic Area Visitor Center about snowmobiling areas.
- Campfire permits are required outside of campgrounds for all campfires, barbecues and stoves except portable stoves in designated parking lots.
- In order to protect nesting birds, **all visitors are required to remain at least one mile away from Paoha and Negit Islands and the islets between April 1 and August 1.**



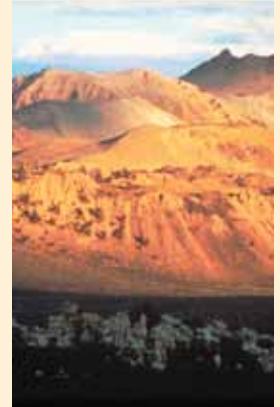
The islands

Photo by Mono Lake Committee



Ranger guided tufa walk

Photo by Mono Lake Tufa State Reserve



Mono craters

Photo by Mono Lake Committee